(3) A small sharp foreign body is pushed straight through the bowel wall with minimal necrosis (Ginzburg & Beller 1927).

Fish bones are presumably effective perforators because they tend to be sharp at both ends, are frequently swallowed and, perhaps because of their curve, they tend to lodge in the bowel.

This case is only the fourth case of perforation of a jejunal diverticulum by a foreign body to be described in the literature. One case was caused by a 3 cm length of steak bone (Navarre & Schmidt 1958), one by a 2 cm fish bone (Fidler 1972) and the third by a vegetable stalk (Shaw 1980). This low incidence of perforation by foreign bodies is in marked contrast to Meckel's diverticulum where it is a well recognized complication (Rosswick 1965), in spite of the incidence of diverticula being similar in these two sites. It is perhaps accounted for by the wide neck which allows the relatively easy influx and egress of food in jejunal diverticula.

Perforations are usually secondary to diverticulitis (Babcock *et al.* 1976), but may be due to trauma or even slow-release iron tablets (Ingold 1977). Often there is no previous history of jejunal diverticulosis and the diagnosis is made at laparotomy.

Surgical treatment ideally should remove the affected segment, but if a very large resection is required just the perforated segment may be removed. An acute perforation may simply be oversewn and, if necessary, the diverticulum invaginated or an omental patch applied.

Acknowledgment: I should like to thank Mr C C Ware for permission to report this case, and Mr S Ganley for Figure 1.

References

Ashby B S & Hunter-Craig I D
(1967) *British Journal of Surgery* **54**, 382–384
Babcock T L, Hutton J E & Salander J M
(1976) *American Surgeon* **42**, 568–571
Baskin R H & Mayo C W
(1952) *Surgical Clinics of North America* **32**, 1185–1196
Benson R E, Dixon C F & Waugh J M
(1943) *Annals of Surgery* **118**, 337–393
Bremer J L
(1944) *Archives of Pathology* **38**, 132–140
Cooper A P
(1804) The Anatomy and Surgical Treatment of Inguinal and Congenital Hernia. T Cox, London; p 364
Edwards H C
(1936) *Annals of Surgery* **103**, 230–254
Fidler M
(1972) *British Journal of Surgery* **59**, 744–745
Ginzberg L & Beller A J
(1927) *Annals of Surgery* **86**, 928–939
Ingold C J H
(1977) *British Medical Journal* i, 949–950
Navarre J R & Schmidt E H
(1958) *Ohio Medical Journal* **54**, 619–621
Orr I M & Russell J Y M
(1951) *British Journal of Surgery* **39**, 139–147
Philips J H C
(1953) *British Journal of Surgery* **40**, 350–354
Rosedale R S
(1935) *Surgery, Gynecology and Obstetrics* **61**, 223–228
Rosswick R P
(1965) *Postgraduate Medical Journal* **41**, 105–107
Shaw J H F
(1980) *New Zealand Medical Journal* **91**, 384–385

Meleney's progressive synergistic bacterial gangrene due to subcutaneous end-ileostomy perforation, with delayed plastic reconstruction[1]

David A Bowdler MB FRCS[2]
(for **K P Robinson** FRCS and **R Heddle** FRCS)
Westminster Hospital, London SW1

Meleney's progressive synergistic bacterial gangrene is a rare form of gangrene. It usually affects the trunk, though occasionally the limbs and, once controlled, leaves a large exposed area which necessitates plastic reconstruction. A case is now reported of a subcutaneous end-ileostomy perforation, leading to Meleney's synergistic gangrene, in a man on whom delayed plastic reconstruction was performed to cover the bare area and refashion a new end-ileostomy faceplate.

Case report

A 48-year-old Caucasian man was admitted to his local hospital complaining of malaise and increasing pain around his end-ileostomy, created in 1978 at panproctocolectomy for ulcerative colitis. On examination he was pyrexial with duskiness, blistering and tenderness around his stoma, but no intra-abdominal signs. He was treated by intravenous rehydration, penicillin, gentamycin and metronidazole. However, the area affected extended dramatically over 24 hours, and a diagnosis of Meleney's progressive synergistic bacterial gangrene was made. Early bacteriology showed only *Escherichia coli* and *Streptococcus faecalis*.

The patient was transferred to Westminster Hospital for hyperbaric oxygen treatment but, despite three periods of treatment, by the third day of hospitalization the affected area had extended to 50×20 cm around the end-ileostomy. Consequently operative excision of the affected area with a margin of normal tissue and down to the intact deep fascia was performed; an inferior perforation of the stoma was noticed just superficial to the deep fascia. Postoperative soiling from the stoma caused an abscess to form in the

[1]Case presented to Clinical Section, 15 May 1981. Accepted 12 February 1982
[2]Present address: Department of ENT Surgery, St Thomas' Hospital, London SE1 7EH

0141–0768/82/090749–03/$01.00/0

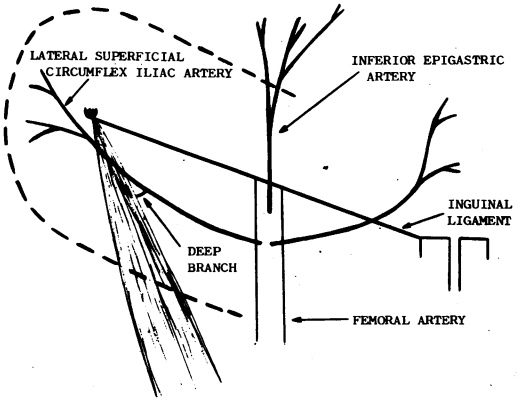

Figure 1. The groin flap shown diagrammatically with the anatomical landmarks used to plan the flap

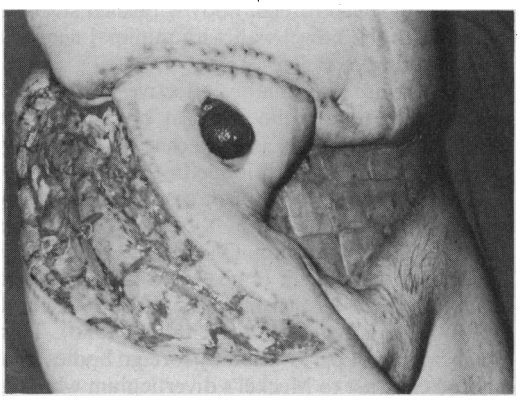

Figure 2. The flap rotated with the ileostomy pulled through a central slit, thus providing a new faceplate

right flank which required surgical incision and drainage two weeks after the initial surgery. The soiling was eventually controlled by continuous suction applied to a Foley catheter inserted into the stoma. It was further limited by using an elemental diet, Vivonex.

Treatment of the ileal stoma was carried out in the fifth week – first by simple closure of the fistula, which failed, and then by refashioning the end-ileostomy with excision of the distal four inches of ileum.

Once clear of the soiling, the exposed area granulated well and the reconstructive phase began in the seventh week. In the first operation a right groin flap based on the superficial circumflex iliac artery (Figure 1) was delayed around its margins; also split skin was taken and applied as postage stamps to the lateral aspects of the exposed area. This was repeated later on the ward with stored skin. The final operation three weeks later was to raise the groin flap and rotate it in a cephalic direction on to its medial pedicle; it was placed so that the stoma could be brought through a slit in its centre, and both flap and stoma were sutured into position (Figure 2). The new faceplate was immediately effective for a standard ileostomy appliance. The patient was discharged at the end of his twelfth week in hospital and remains well 8 months later.

Discussion

Meleney's progressive synergistic bacterial gangrene is one of a number of malignant gangrenous conditions. It was described by Luckett in 1909, but Brewer & Meleney first clearly defined the process with supportive bacteriological studies in 1926. Meleney's gangrene affects the skin and subcutaneous tissues but not the deep fascia except in advanced cases; it may follow intra-abdominal surgery, around the incision or sutures (Henderson 1977), but cases associated with colorectal disease (Flanigan *et al.* 1978), genitourinary disease (Roberts & Hester 1972), fistulae (present case) or occurring spontaneously (Daly *et al.* 1978) are also described. Predisposing factors may be diabetes or alcoholism (Stone & Martin 1972). The causative organisms, microaerophilic non-haemolytic Streptococcus and haemolytic *Staphylococcus pyogenes*, should be cultured from the outer erythematous margin (Meleney 1931); cultures from the central necrotic area usually grow enterobacteriae.

Occasionally antibiotics alone may cure the condition (Meleney *et al.* 1945) and hyperbaric oxygen can cause complete remission (Grainger *et al.* 1967), but usually early recognition and wide radical excision to normal tissue is indicated with local antiseptic application and systemic antibiotics. There is still a significant mortality: as high as 40% in otherwise healthy subjects and as high as 90% with associated disease such as diabetes (Stone & Martin 1972). Surgery leaves a large exposed area which requires reconstructive plastic surgery, usually by split skin grafts.

The groin flap was described by Shaw & Payne in 1946, and extensive anatomical studies were carried out by Smith *et al.* (1972) which confirmed its axial nature. McGregor & Jackson (1972) described its uses – mainly as tube pedicles, for forearm and groin reconstruction, and resurfacing the hand. Because of its axial supply from the lateral superficial circumflex iliac artery, it may be prolongated beyond the anterior superior iliac crest by the width of the graft, which can be up to 19 cm, with almost no risk (McGregor 1975).

The groin flap used in our patient to fashion a new faceplate was as effective as the old stoma site. This technique could possibly be used in other cases where the stoma site is scarred or requires

excision of skin due to fistulae or sinuses causing difficult stoma care.

References

Brewer G E & Meleney F L
(1926) *Annals of Surgery* **84**, 438–450
Daly J W, Lukowski M J & Monif G R G
(1978) *American Journal of Obstetrics and Gynecology* **114**, 285–289
Flanigan R C, Kursh E D, McDougal W S & Persky L
(1978) *Journal of Urology* **119**, 369–371
Grainger R W, MacKenzie D A & McLachlin A D
(1967) *Canadian Journal of Surgery* **10**, 439–444
Henderson W H
(1977) *Obstetrics and Gynecology*. **49**, Suppl 1; pp 24–27
Luckett W H
(1909) *Annals of Surgery* **50**, 605–608
McGregor I A
(1975) Fundamental Techniques of Plastic Surgery and their Surgical Applications. 6th edn. Churchill Livingstone, Edinburgh; pp 427–436
McGregor I A & Jackson I T
(1972) *British Journal of Plastic Surgery* **25**, 3–16
Meleney F L
(1931) *Annals of Surgery* **94**, 961–981
Meleney F L, Friedman S T & Harvey H D
(1945) *Surgery* **18**, 423–435
Roberts D B & Hester L L
(1972) *American Journal of Obstetrics and Gynecology* **114**, 285–289
Shaw D T & Payne R L
(1946) *Surgery, Gynecology and Obstetrics* **83**, 205–209
Smith P J, Foley B, McGregor I A & Jackson I T
(1972) *Plastic and Reconstructive Surgery* **49**, 41–47
Stone H H & Martin J D
(1972) *Annals of Surgery* **175**, 702–710